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A New Disease in Iowa Corn Fields

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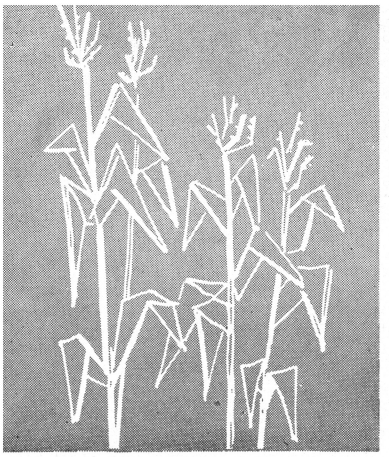


A NEW DISEASE IN IOWA CORN FIELDS

It resembles "maize dwarf mosaic" found in Ohio. Symptoms vary widely and may include red or purple streaking of leaves or severe stunting. Research is underway and will be intensified.

by R. C. Lambe and J. M. Dunleavy

AN APPARENTLY new disease of corn in 11 Iowa counties ıas been positively confirmed in owa State University greenhouses his fall and winter. We suspected ıs much last August and Septem- ɔer when we found some stunted :orn plants with red to purple treaks in the upper leaves.

We had just seen many such ɔlants in Indiana and Illinois. So ve looked carefully for them last ummer in corn fields in 32 coun- ies of southern, central and north- ern Iowa. *Some were found.* This eport is to tell you about them.

Where It All Started . . .

The Iowa corn disease very much esembled what has been desig- ıated maize dwarf mosaic disease n Ohio which in turn resembles omewhat the corn stunt disease f southwestern U.S.

Corn stunt virus was first discov- ered in the United States in 1945 in California. Prior to 1962, however, orn stunt disease was not known o occur east of Texas or north of he states bordering Mexico. In 962 an outbreak occurred in Mis- issippi, and limited areas of sus- ɔected infection were found in ouisiana and southern Ohio.

Corn stunt virus cannot be trans- erred from diseased to healthy ɔlants by contact or rubbing. How- ver, the Ohio virus could be so transmitted, and it became apparent that a disease different than corn stunt was involved. The new Iowa disease has been mechanically transmitted, so in that respect it is comparable to the Ohio maize dwarf mosaic and not to corn stunt.

Symptoms in the Field . . .

Disease symptoms varied greatly. On some plants we found a few entirely red leaves whereas other plants had leaves with red to purple bands. There was no apparent correlation between intensity of red coloration and severity of other symptoms. Nor were red leaves a good indication of infection.

Infected plants ranged in height from normal to severely stunted. Plants only 24 inches tall were observed. On some plants all internodes were short; on other plants only internodes above the ear were short. Infected plants of normal height produced cobs of normal length, but with few or no kernels.

Some of the plants developed multiple ears at a single node, and in extreme instances nubbins occurred on six successive nodes. Infected plants usually were on the edges or corners of fields. They occurred in sites ranging from river bottoms to uplands.

Our Iowa Survey . . .

During our survey in August, the youngest leaves were taken from Iowa-produced corn plants suspected of being diseased and immediately placed in polyethylene bags. The bags were tightly sealed and held at approximately 50 degrees for 24 hours until the leaves were tested for the disease. Leaf samples were taken from 47 Iowa fields.

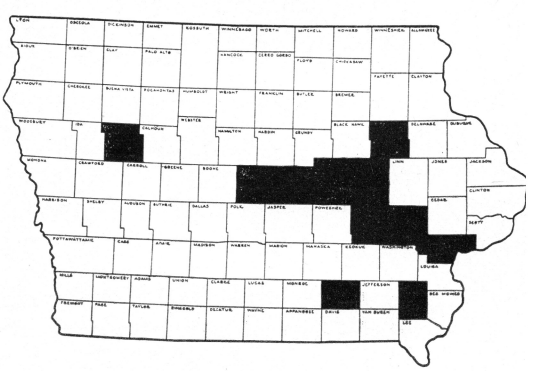
The causal agent was transmitted mechanically from plants grown in the following Iowa counties: Benton, Buchanan, Henry, Iowa, Johnson, Marshall, Muscatine, Sac, Story, Tama and Wapello. (See map below.)

Although the number of corn plants in Iowa afflicted with the new disease during 1964 was probably small, the potential of this disease cannot be ignored. Reports from Ohio indicate an increase of what is currently called maize dwarf mosaic from 1962 to 1964.

What Lies Ahead . . .

There are no guide lines that can be used to predict abundance and distribution of the disease in Iowa. We may find more infection this year simply because more people will be looking. Though only a small yield loss was probably incurred in 1964, even small losses are important to Iowa's corn crop.

What can you as a farmer do to avoid losses from this disease? All



Corn disease resembling maize dwarf mosaic was found last fall in the 11 Iowa counties indicated above.

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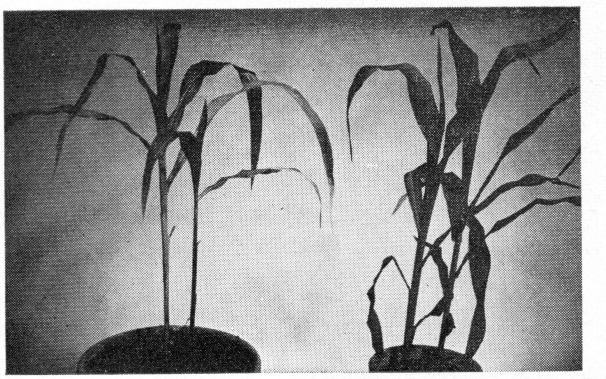
Diseased corn leaf is shown three weeks after inoculation (top); healthy corn leaf is at bottom.

The corn disease found in Iowa can be transmitted mechanically by rubbing fingers on infected leaves and then on healthy leaves.



Greenhouse specimens show the spindly stalk and leaf growth of infected plant (left) compared with healthy corn plant.

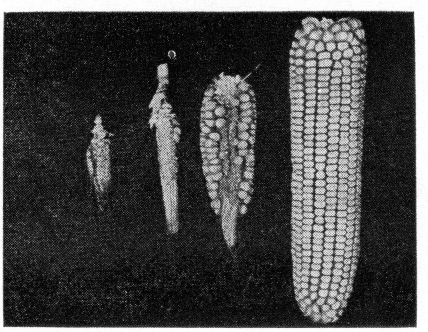
we can say now is "Do the best job you know how in raising your corn." Corn plants we saw growing in weed-free Indiana fields did not show the severe symptoms seen in nearby weedy fields.

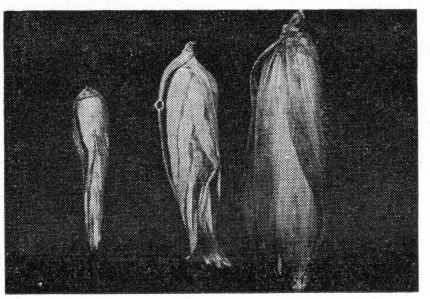
Meanwhile, much remains to be learned. Observations and experiments will be continued and intensified in 1965. There will be observations and measurements throughout the season of infected plants alongside similar plants kept healthy.

The possible role of other crop plants and weeds in harboring corn viruses has to be explored. It may be possible to prevent infection of susceptible varieties. If the disease becomes widespread in Iowa, there may be need for resistant varieties.

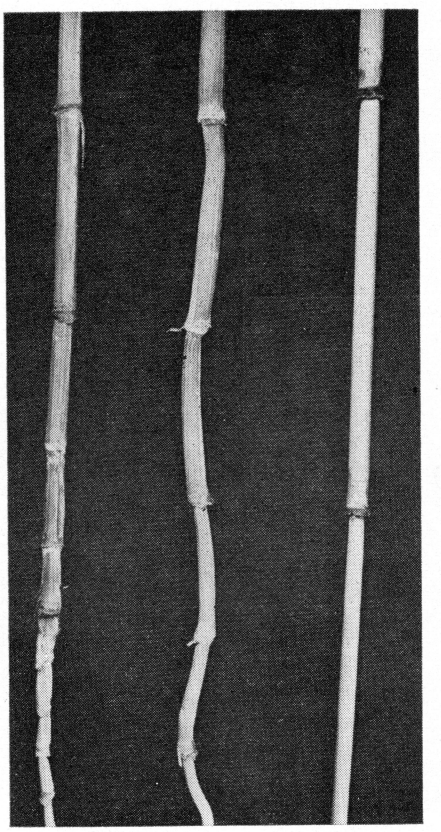
Because a number of other factors can cause the development of red pigments in corn leaves, experiments will also have to be designed to determine the factors that modify disease expression or cause development of virus-like symptoms in corn.

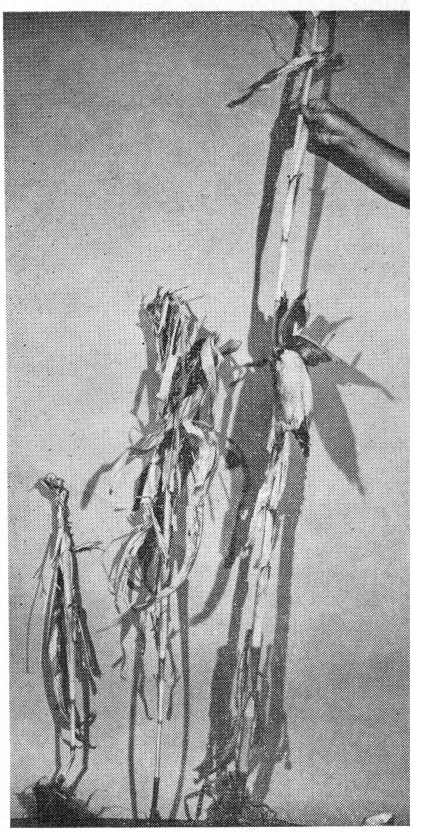
Above all, there will be a concerted effort to find out how much of this disease there is in Iowa during the next several years and how the disease is transmitted under natural conditions.





Comparisons with normal ear development (at right in pictures above) show how the disease may stunt ears.





Shortened internodes or crooked stalks may result from infection with the disease. Normal stalks are shown at right in each picture above.